# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/009,649 | 05/29/2002 | Martin Vorbach | 2885/56 | 8424 |

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| 26646    7590    03/28/2006 | | EXAMINER |
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DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE __03__ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1) ☒ Responsive to communication(s) filed on _29 May 2002_.

2a) ☐ This action is **FINAL**.　　2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4) ☒ Claim(s) _179-202_ is/are pending in the application.

　　4a) Of the above claim(s) _1-178_ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _179-202_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

## Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _May 29, 20002_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a) ☒ All　b) ☐ Some * c) ☐ None of:

　　　　1. ☒ Certified copies of the priority documents have been received.

　　　　2. ☐ Certified copies of the priority documents have been received in Application No. _____.

　　　　3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _12/10/01 10/15/04_.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

1. This action is responsive to the application filed on May 29, 2002.

2. In the Preliminary Amendment filed on December 10, 2001, Applicants cancelled claims 2-178. In the Preliminary Amendment filed on June 25, 2002, Applicants cancelled claim 1 and add new claims 179-202.

Claims 179-202 have been examined. Claims 179, 180, 181, 190, and 194 are independent claims.

### Priority

3. The application claims priority to PCT patent application No. PCT/DE00/01869 filed on June 13, 2000.

The application claims priority under Foreign Applications DE 199 26 538.0 filed June 10, 1999; DE 100 00 423.7 filed January 9, 2000; and DE 100 18 119.8 filed April 12, 2000.

The priority date considered for this application is June 10, 1999.

### Information Disclosure Statement

4. The Office acknowledges receipts of the Information Disclosure Statement filed on December 10, 2001 and October 15, 2004. They include total 11 pages with around 186 US Patents and US Patent Publications, 58 Foreign Patents, and approximately 1400 pages of Non-Patent Literature documents.

They have been placed in the application file and the information referred to therein has been considered to the best ability by the examiner.

### Oath / Declaration

5. The Office acknowledges receipt of a properly signed oath/declaration filed on May 29, 2002.

### Drawings

6. The drawings are objected to because:

Fig. 1, "HDL" should be spelled out.

Figs. 1-3 and 8-9 should be labeled --Prior Art-- instead of "Related Art".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

## Specification

7. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Appropriate correction is required.

8. The title of the invention "*Programming Concepts*" is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

9. The disclosure is objected to because of the following informalities:

Page 1, "Area of Application" should be replaced by --Field of the Invention--.

Page 2, "Background Information" should be replaced by --Description of Related Art--.

Page 3-7, Figure 4, 5, 6, 8, 9, 10, etc. should be replace by Figure 4a-b, 5a-b, ..., 10a-c, ..., 13a-j, 13g*-j*, etc.

The section --Brief Summary of the Invention-- should be added.

Page 7, "Detailed Description of an Example Embodiment" should be replaced by --Detailed Description of the Invention--.

Appropriate correction is required throughout the whole disclosure.

10. Various terms should be spelled out at the first appearance in the disclosure:

Page 1: VPUs, CT, IOAG;

Page 5: FIFO;

Page 14: SMP, ALU;

Page 17: PA, VLIW;

Page 18: MMX, ILP, CISC;

etc.

Appropriate correction is required throughout the whole disclosure.

11. Remarks of Preliminary Amendment filed on June 25, 2002 is objected to because the first page does not begin on a separate sheet but belongs to the claim listing (page 6).

**Claim Objections**

12. Listing of claims is objected to because it does not commence on separate sheets (page 6).

13. Claim 194, line 2, is objected to because of minor informalities. The phrase "...having a cellular structure, the <u>cell</u> structure including ..." should be --...having a cellular structure, the <u>cellular</u> structure including ... --.

Appropriate correction is required.

## Claim Rejections – 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claim 180 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,021,947 to Campbell et al. (hereinafter "Campbell").

**Claim 180:**

Campbell discloses *a method for programming a system having a cellular structure* (e.g., col.13: 38-48), *comprising:*

*extracting a data flow graph program* (e.g., FIG. 18, col.17: 1-26; FIG. 1, col.6: 13-16);

*separating the data flow graph into a plurality of subgraphs* (e.g., FIG. 1, col.6: 16-27); *and*

*distributing the plurality of subgraphs among a plurality of hardware modules* (e.g., col.1: 57 – col.2: 4; col.7; 56-63; col.13: 38-48).

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

17. Claims 179, 181, 185, and 187-188 are rejected under 35 U.S.C. 102(e) as being unpatentable by US Patent No. 5,966,534 to Cooke et al. (hereinafter "Cooke").

**Claim 179:**

Cooke discloses *a method for programming a system having a cellular structure* (e.g., col.5: 31-41), *comprising:*

 *extracting a control flow graph of a program* (e.g., col.2: 60-64; col.6: 45-48);

 *separating the control flow graph into a plurality of subgraphs* (e.g., col.2: 25-27; col.3: 23-26; col.6: 4-10); *and*

 *distributing the plurality of subgraphs among a plurality of programmable hardware modules* (e.g., col.5: 31-41; col.6; 9-17 and 19-37).

**Claim 181:**

Cooke discloses *a method for programming a system having a cellular structure, comprising:*

 *extracting from a program at least one of a data flow graph and a control flow graph* (e.g., col.2: 60-64);

 *separating the at least one of the graphs into a plurality of subgraphs* (e.g., col.5: 31-41); *and*

 *distributing the plurality of subgraphs among a plurality of hardware modules* (e.g., col.3: 18-26).

**Claim 185:**

The rejection of base claim 181 is incorporated.   Cooke also discloses *the separating step includes separating the at least one of the graphs into the plurality of subgraphs so that the subgraphs match resources of the hardware modules* (e.g., col.5: 16-24; col.6: 38-45).

**Claim 187:**

The rejection of base claim 181 is incorporated.   Cooke also discloses *each of the plurality of subgraphs includes nodes, the method further comprising:*

*transmitting status signals between nodes within one of the subgraphs so that a state of each individual one of the nodes of the one of the subgraphs is available to each of the other nodes of the one of the subgraphs* (e.g., col.5: 50 – col.6: 8).

**Claim 188:**

The rejection of base claim 181 is incorporated.   Cooke also discloses *each of the plurality of subgraphs includes nodes, the method further comprising:*

*transmitting status signals from a first node of at least one of the plurality of subgraphs to a higher-level unit adapted to control configuration of the plurality of hardware modules so as to trigger reconfiguration* (e.g., col.5: 50 – col.6: 8).

18. Claims 190-193 are rejected under 35 U.S.C. 102(e) as being unpatentable by US Patent No. 5,841,973 to Kessler et al. (hereinafter "Kessler").

**Claim 190:**

Kessler discloses *a method of executing a program on a system having a cellular structure* (e.g., Figs 1-2, col.5: 19-41), *comprising:*

*transmitting a data signal from a first cell to a second cell* (e.g., col.3: 14-22; FIG. 6, col.9: 7-32); *and*

*transmitting a status with the data signal, the status indicating whether the data signal is valid* (e.g., FIG. 7, col.9: 33-42).

**Claim 191:**

The rejection of base claim 190 is incorporated. Kessler also discloses *receiving a valid data signal at the second cell and acknowledging receipt of the valid data signal* (e.g., col.10: 41-47).

**Claim 192:**

The rejection of base claim 190 is incorporated. Kessler also discloses *transmitting by the second cell an indication that a signal is expected* (e.g., col.11: 65 – col.12: 3).

**Claim 193:**

The rejection of base claim 190 is incorporated. Kessler also discloses *transmitting by the first cell an indication that the first cell is transmitting the expected signal* (e.g., col.10: 48-54).

19. Claims 194-202 are rejected under 35 U.S.C. 102(e) as being unpatentable by US Patent No. 6,170,051 to Dowling (hereinafter "Dowling").

**Claim 194:**

Dowling discloses *a method of executing a program on a system having a cellular structure, the cell structure including a plurality of cells* (e.g., col.3: 25-32; col.4: 1-11; col.6: 63-67), *the method comprising:*

*forming a plurality of subgraphs based on a program* (e.g., col.6: 45-62; col.12: 34-64);

*computing a first part of a first one of the subgraphs with a first cell* (e.g., FIG. 3, col.10: 57-62);

*after the computing, reconfiguring the first cell for computation of a first part of a second one of the subgraphs* (e.g., col.11: 1-11); *and*

*simultaneously with the reconfiguring, computing a second part of the first subgraph with a second cell* (e.g., col.11: 13-19).

**Claim 195:**

The rejection of base claim 194 is incorporated. Dowling also discloses *storing configurations for the first one of the subgraphs and the second one of the subgraphs configuration registers associated with the first cell* (e.g., FIG. 3, Register Files 300, 305; Registers 367, 368, 337, 338, col.10: 21-36, col.10: 10-55).

**Claim 196:**

The rejection of base claim 194 is incorporated. Dowling also discloses *marking unconfigured ones the configuration registers as unconfigured* (e.g., FIG. 3, col.10: 25-33).

**Claim 197:**

The rejection of base claim 194 is incorporated. Dowling also discloses *selecting a configuration for the first cell based on a status signal generated by the cell structure* (e.g., FIG. 3, col.10: 31-33).

**Claim 198:**

The rejection of base claim 194 is incorporated. Dowling also discloses *selecting a configuration for the first cell based on a status signal generated by a higher-level loading unit* (e.g., col.10: 57-62).

**Claim 199:**

The rejection of base claim 194 is incorporated. Dowling also discloses *selecting a configuration for the first cell based on an externally generated status signal* (e.g., col.10: 25-30).

**Claim 200:**

The rejection of base claim 194 is incorporated. Dowling also discloses *selecting a configuration for the first cell as a function of a present configuration of the first cell and a received status signal* (e.g., col.11: 4-19).

**Claim 201:**

The rejection of base claim 194 is incorporated. Dowling also discloses

*activating an unconfigured configuration register in the first cell* (e.g., col.11: 1-8);

*requesting a configuration from a higher-level load unit when the unconfigured configuration register is activated* (e.g., col.11: 8-11); *and*

*suspending execution of a subgraph until the requested configuration is fully loaded* (e.g., col.11: 8-11).

**Claim 202:**

The rejection of base claim 194 is incorporated. Dowling also discloses *triggering a loading of a configuration of the first cell when a status signal generated by the cell structure received by the first cell* (e.g., col.10: 47-55).

**Claim Rejections – 35 USC § 103**

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

21. Claims 182-184 and 186 are rejected under 35 U.S.C. 103(a) as being unpatentable by Cooke in view of US Patent No. 6,421,809 to Wuytack et al. (hereinafter "Wuytack").

**Claim 182:**

The rejection of base claim 181 is incorporated. Cooke does not explicitly disclose *the separating step including separating the at least one of the graphs so as minimize connections between the plurality of subgraphs.*

However, in an analogous art of parallel processing optimization (e.g., col.3: 2-8), Wuytack discloses the separating step including separating the at least one of the

graphs so as minimize connections between the plurality of subgraphs (e.g., col.14: 31-41; col.22: 6-27).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Wuytack into that of Cooke. One would have been motivated to do so to enhance the Cooke's method and optimize memory organization and data parallel access capabilities as suggested by Wuytack (e.g., col.2: 53 – col.3: 28).

**Claim 183:**

The rejection of base claim 181 is incorporated. Wuytack further discloses *the separating step includes separating the at least one the graphs into the plurality of subgraphs so that data transmission between the plurality of subgraphs is minimized* (e.g., col.7: 26-35; col.8: 24-32).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Wuytack into that of Cooke. One would have been motivated to do so as set forth above.

**Claim 184:**

The rejection of base claim 181 is incorporated. Wuytack further discloses *the separating step includes separating the at least one of the graphs into the plurality of subgraphs so that no loop-back is obtained between the plurality of subgraphs* (e.g., col.14: 31-41; col.22: 6-27).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Wuytack into that of Cooke. One would have been motivated to do so as set forth above.

**Claim 186:**

The rejection of base claim 181 is incorporated. Wuytack further discloses *inserting memory elements between the plurality subgraphs, the memory elements*

*adapted to save data passed between subgraphs* (e.g., col.3: 8-29; col.9: 66 – col.10: 14).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Wuytack into that of Cooke. One would have been motivated to do so as set forth above.

22. Claim 189 is rejected under 35 U.S.C. 103(a) as being unpatentable by Cooke in view of US Patent No. 6,301,706 to Maslennikov et al. (hereinafter "Maslennikov").

**Claim 189:**

The rejection of base claim 181 is incorporated. Cooke does not explicitly disclose *the extracting step includes, for a conditional instruction, extracting a plurality of different subgraphs, each representing a different instruction path, one of the different subgraphs being executed depending on an evaluation of the conditional instruction.*

However, in an analogous art of optimizing parallel processing architectures (e.g., col.2: 13-16), Maslennikov discloses the extracting step includes, for a conditional instruction, extracting a plurality of different subgraphs, each representing a different instruction path, one of the different subgraphs being executed depending on an evaluation of the conditional instruction (e.g., col.2: 36-58).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Maslennikov into that of Cooke. One would have been motivated to do so to enhance the Cooke's system and reduce redundant speculative computations in the loop body as suggested by Maslennikov (e.g., col.2: 1-10).

## Conclusion

22. Any inquiry concerning this communication should be directed to examiner Thuy Dao (Twee), whose telephone is (571) 272 8570. The examiner can normally be reached on Monday – Friday from 6:30AM to 3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam, can be reached at (571) 272 3695.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273 8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is (571) 272 2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

T. Dao

TUAN DAM
SUPERVISORY PATENT EXAMINER